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Breaking the Sedentary Hour: Cardiometabolic and Fatigue Outcomes of a 50:10 Sitting–Walking Pattern in Sedentary Adults

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Abstract

Background: Prolonged uninterrupted sitting is increasingly associated with adverse cardiometabolic outcomes, particularly among desk-based adults. Incorporating short, structured walking breaks during working hours may provide a practical strategy to reduce sedentary exposure.

Methods: This prospective observational study included 66 sedentary adults attending Yatharn Super Speciality Hospital, Himachal Pradesh, between May 2025 and February 2026. Participants followed a structured schedule consisting of 50 minutes of sitting followed by 10 minutes of brisk walking during working hours. Glycemic, cardiovascular, anthropometric, activity and fatigue-related parameters were assessed at baseline and follow-up.

Results: Mean fasting blood glucose decreased from 101.8±14.6 to 96.2±12.8 mg/dL, while postprandial glucose decreased from 139.7±22.5 to 127.0±19.8 mg/dL ($p<0.001$). Significant reductions were observed in systolic and diastolic blood pressure, resting heart rate, BMI and waist circumference. Daily step count increased from 4970±1650 to 7780±1910 steps, while perceived fatigue decreased from 5.8±1.7 to 3.8±1.5 ($p<0.001$). Mean adherence was 83.6%, and no serious adverse events occurred.

Conclusion: Regular 10-minute brisk-walking breaks after every 50 minutes of sitting were associated with favorable cardiometabolic, activity and fatigue-related changes in sedentary adults. Controlled trials are warranted to confirm these findings.

Keywords: Activity breaks; Brisk walking; Cardiometabolic health; Sedentary behaviour; Workplace physical activity

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Introduction:

Prolonged sedentary behaviour is an important modifiable risk factor for obesity, dysglycaemia, hypertension and cardiometabolic disorders, particularly among desk-based workers. Indian evidence indicates that sedentary occupations are common and associated with adverse metabolic profiles, while recent ICMR-INDIAB data have highlighted physical inactivity and prolonged sitting among adults [1, 2]. Among Indian sedentary office workers, greater adiposity has also been associated with unfavorable glucose, lipid and blood-pressure parameters, reinforcing the need for practical workplace strategies [3]. Breaking prolonged sitting with short bouts of walking may increase daily energy expenditure, enhance skeletal-muscle glucose uptake and decrease fatigue without requiring a separate exercise session. However, the effectiveness and feasibility of a structured "50 minutes sitting–10 minutes brisk walking" pattern have not been adequately evaluated in Indian adults. Therefore, this study aims to assess the effect of 10-minute brisk-walking breaks after every 50 minutes of sitting on glycemic, cardiovascular and perceived fatigue parameters in sedentary adults.

Methods:

This prospective observational study was conducted at Yatharn Super Speciality Hospital, Himachal Pradesh, from May 2025 to February 2026 among 66 sedentary adults. Participants aged 18–60 years who were engaged predominantly in desk-based work and remained seated for prolonged periods during their routine working hours were considered eligible. Individuals who were able to undertake brisk walking without assistance and who provided informed consent were included. Participants with established cardiovascular disease, severe respiratory illness, uncontrolled hypertension, significant musculoskeletal or neurological disorders limiting walking, pregnancy, recent major surgery, or any medical condition in which brisk walking was contraindicated were excluded. Ethical approval was obtained from the institutional ethics committee before commencement of the study, and written informed consent was obtained from all participants. Demographic and baseline clinical information, including age, sex, occupation, duration of sedentary work, smoking and alcohol history, physical activity pattern, height, weight, body mass index, waist circumference, resting heart rate, systolic blood pressure and diastolic blood pressure, was recorded using a structured proforma. Baseline fasting blood glucose and postprandial blood glucose

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were also documented wherever available as part of routine clinical assessment.

Participants were prospectively observed while following a structured activity-break pattern during their usual working day. They were advised to remain seated for approximately 50 minutes during their routine desk work and subsequently perform 10 minutes of brisk walking, after which they resumed their usual sedentary activity. Brisk walking was defined as walking at a self-selected moderate intensity sufficient to increase breathing and heart rate while still allowing the participant to speak comfortably. The sitting–walking cycle was followed repeatedly during the working period, preferably for at least six working hours per day. Participants were instructed regarding the walking protocol at enrolment and were encouraged to maintain their usual diet, medication, sleep pattern and other physical activities throughout the observation period to minimize major lifestyle-related variations. Compliance with the activity-break schedule was assessed using participant-maintained daily activity logs, and where feasible, step counts recorded through smartphones or wearable devices were noted. Cardiovascular parameters, including resting systolic blood pressure, diastolic blood pressure and heart rate, were measured using standard procedures after adequate rest. Glycemic parameters were assessed using fasting and postprandial blood glucose measurements. Perceived fatigue was assessed using a simple standardized fatigue rating scale, and participants were also questioned regarding musculoskeletal discomfort, feasibility of the walking schedule and any adverse symptoms experienced during brisk walking.

Participants were followed prospectively during the study period, and changes in clinical, cardiovascular, glycemic and subjective parameters were documented at predefined follow-up assessments. The primary outcomes included change in postprandial blood glucose and perceived fatigue associated with regular interruption of prolonged sitting by brisk-walking breaks. Secondary outcomes included changes in systolic blood pressure, diastolic blood pressure, resting heart rate, body mass index, waist circumference, daily step count, musculoskeletal discomfort and adherence to the walking-break schedule. Data were entered into Microsoft Excel and analysed using SPSS version 21. Continuous variables were expressed as mean ± standard deviation or median with interquartile range according to data distribution, while categorical variables were presented as frequency and percentage. Baseline and follow-up continuous variables were compared using paired Student's t-test for normally distributed data or Wilcoxon signed-rank test for non-normally distributed data.///Associations between adherence to the walking-break protocol and outcome variables were assessed using correlation or regression analysis where appropriate. A p-value <0.05 was considered statistically significant.

Results:

The study included 66 sedentary adults with a mean age of 39.8 ± 9.6 years, of whom 40 (60.6%) were males and 26 (39.4%) were females. Participants spent an average of 8.3 ± 1.4 hours per day in sedentary work, and 43 (65.2%) were overweight or obese (Table 1). Following regular implementation of the 50-minute sitting and 10-minute brisk-walking schedule, significant improvements were observed in metabolic and cardiovascular parameters. Mean fasting blood glucose decreased from 101.8 ± 14.6 to 96.2 ± 12.8 mg/dL, while postprandial glucose declined from 139.7 ± 22.5 to 127.0 ± 19.8 mg/dL (both $p<0.001$). Systolic blood pressure decreased by 4.8 mmHg and diastolic pressure by 3.1 mmHg, with significant reductions also observed in resting heart rate, BMI and waist circumference (Table 2). Mean daily step count increased from 4970 ± 1650 to 7780 ± 1910 steps, whereas perceived fatigue decreased from 5.8 ± 1.7 to 3.8 ± 1.5 ($p<0.001$). Musculoskeletal discomfort declined from 62.1% to 36.4%. Mean adherence to the walking-break schedule was 83.6%, with 46 (69.7%) participants achieving at least 80% adherence (Table 3). Greater adherence was significantly correlated with larger reductions in postprandial glucose ($r=0.42$), systolic blood pressure ($r=0.36$) and fatigue ($r=0.48$), as well as increased daily step count ($r=0.31$) (Table 4). No serious adverse events related to brisk walking were observed.

Discussion:

The present prospective observational study evaluated a simple workplace strategy in which sedentary adults interrupted every 50 minutes of sitting with 10 minutes of brisk walking. The findings suggested favorable changes across glycemic, cardiovascular, anthropometric and subjective health parameters. At baseline, participants had a mean sedentary work duration of 8.3 hours/day, while nearly two-thirds were overweight or obese, illustrating the clustering of prolonged sitting and excess adiposity in desk-based populations. Recent ICMR-INDIAB data from Haryana similarly demonstrated substantial sedentary behaviour and inadequate physical activity among Indian adults, emphasizing the growing importance of movement-related risk factors in prevention of non-communicable diseases [1]. At the national level, the ICMR-INDIAB study involving more than 113,000 adults reported a diabetes prevalence of 11.4%, hypertension of 35.5%, generalized obesity of 28.6% and abdominal obesity of 39.5%, demonstrating the considerable cardiometabolic burden in India [4]. These findings

provide an important context for workplace interventions because prolonged occupational sitting may contribute to a cumulative reduction in daily energy expenditure and skeletal-muscle activity. Naik et al., studying sedentary Indian office workers, also demonstrated relationships between adiposity and cardiovascular risk markers and emphasized the usefulness of identifying cardiometabolic risk among apparently healthy desk-based employees [3]. Thus, the present findings support the practical concept that reducing uninterrupted sitting may represent an accessible preventive strategy in adults whose occupation otherwise provides limited opportunities for physical activity.

One of the most clinically relevant observations was the improvement in glycemic parameters. Mean fasting glucose decreased from 101.8 to 96.2 mg/dL, while postprandial glucose decreased from 139.7 to 127.0 mg/dL. Although causality cannot be established from the observational design, repeated brisk-walking bouts may enhance skeletal-muscle glucose uptake through both insulin-dependent and contraction-mediated mechanisms and reduce prolonged periods of metabolic inactivity. Indian investigators have reported comparable benefits of regular walking on glycemic control; a systematic review and meta-analysis by Dhali et al. found that walking significantly reduced fasting glucose and HbA1c among individuals with type 2 diabetes [5]. Saboo and Kacker demonstrated that lifestyle modification incorporating structured physical activity significantly improved fasting glucose, HbA1c and other cardiometabolic parameters in Indian adults with prediabetes [6]. In the multicentre Indian Prevention of Diabetes Study, Madhu et al. found that structured lifestyle measures combined with regular physical activity produced sustained metabolic benefits and reduced progression to diabetes among individuals with prediabetes [7]. A community-based study from Pune similarly demonstrated significant improvement in glycemic and anthropometric parameters following multifaceted lifestyle intervention among adults with prediabetes [8]. Furthermore, long-term follow-up of the Kerala Diabetes Prevention Program has reinforced the importance of sustainable lifestyle modification in high-risk Indian populations [9]. Collectively, these observations support the biological plausibility of the glucose reductions seen in the present study and indicate that short, repeated activity bouts incorporated into working hours may complement conventional recommendations for planned exercise.

The cardiovascular and anthropometric changes observed in the present study were also noteworthy. Systolic blood pressure decreased by approximately 4.8 mmHg and diastolic pressure by 3.1 mmHg, accompanied by a modest reduction in resting heart rate. Repeated moderate-intensity walking may improve vascular endothelial function, peripheral circulation, autonomic balance and overall cardiovascular conditioning. The reductions in BMI and waist circumference, although relatively small, may also be clinically meaningful when maintained over longer periods, particularly because central adiposity is a major cardiometabolic risk factor in South Asian populations. The high baseline prevalence of overweight or obesity in this cohort is consistent with the broader Indian epidemiological transition described by ICMR-INDIAB [4]. Naik et al. specifically studied sedentary Indian office workers and highlighted the relationship between body fat indices and metabolic and cardiovascular markers, supporting the importance of monitoring adiposity among desk-based employees [3]. Workplace-based interventions may therefore offer value beyond increasing physical activity alone by simultaneously addressing several interrelated risk factors. Patel et al. evaluated a workplace intervention among Indian desk-based employees and reported improvement in occupational well-being, although changes in sitting time and cardiorespiratory fitness were limited, indicating that education alone may be insufficient to modify established sedentary habits [10]. In contrast, the structured 50:10 approach in the present study provided a specific behavioral prescription rather than general advice to “be more active,” which may partly explain the observed improvements. Nevertheless, longer controlled studies are required to determine whether modest reductions in blood pressure, BMI and waist circumference are sustained and translate into meaningful reductions in long-term cardiovascular risk.

An additional strength of the present intervention was its apparent influence on daily activity, fatigue and musculoskeletal symptoms. Mean step count increased from approximately 4,970 to 7,780 steps/day, while perceived fatigue scores decreased considerably and the proportion reporting musculoskeletal discomfort declined from 62.1% to 36.4%. These outcomes are relevant because workplace sedentary-behaviour interventions must be feasible and acceptable if they are to produce sustained health benefits. The SMART-STEP trial among Indian sedentary office workers demonstrated that smartphone reminders and structured prompts could reduce sedentary time and encourage physical activity, supporting the feasibility of technology-assisted workplace movement strategies [2]. A subsequent randomized SMART-STEP analysis found that technology-assisted and self-directed interventions could produce reductions in sedentary behaviour, although adherence declined with time, emphasizing the challenge of maintaining participation [11]. Qualitative findings from the same research programme identified workload, insufficient peer support, poor organizational norms and competing

responsibilities as important barriers to sustained workplace activity [12]. Earlier work among Indian white-collar employees also showed that although knowledge and attitudes regarding sedentary behaviour were often favorable, actual workplace practices remained poor, highlighting the gap between awareness and implementation [13]. Similar observations were reported in a systematic review by Bora et al., in which lack of motivation, fatigue, technology use and environmental constraints were identified as barriers to physical activity [14]. The mean adherence of 83.6% observed in the present study is therefore encouraging and may reflect the simplicity and predictability of integrating a 10-minute walking break into each working hour.

The present study has important practical implications because the 50-minute sitting and 10-minute brisk-walking pattern is inexpensive, requires no specialized equipment and can potentially be adopted in offices, hospitals, educational institutions and other desk-based environments. The significant correlations between adherence and reductions in postprandial glucose, systolic blood pressure and fatigue suggest a possible dose-response relationship, although these associations should not be interpreted as proof of causality. Recent evidence on mobile-health strategies among office workers also suggests that prompts, self-monitoring and behavioral reinforcement can support reductions in sedentary time and increases in physical activity, and these tools may be incorporated into future versions of the 50:10 intervention [15]. The study nevertheless had limitations. The sample size was relatively modest, the research was conducted at a single centre, and the absence of a randomized control group limits the ability to distinguish intervention-related changes from temporal trends, dietary changes or other lifestyle influences. Adherence was partly dependent on participant reporting, and objective accelerometer-based assessment of sitting and walking would strengthen future investigations. Dietary intake, sleep duration and occupational stress may also confound glycemic and cardiovascular outcomes and should be measured in subsequent studies. Despite these limitations, the findings provide preliminary Indian clinical evidence supporting structured interruption of prolonged sitting. A multicentre randomized controlled trial comparing uninterrupted sitting with a standardized 50:10 sitting-walking protocol, using continuous glucose monitoring and objective activity measurement, would provide stronger evidence regarding efficacy, optimal frequency, long-term adherence and cardiometabolic benefit.

References

1. Verma M, Kalra S, Deepa M, Venkatesan U, et al. Understanding Epidemiology of Physical Activity and Sedentary Behaviour Among Adults in Haryana: Insights from the ICMR-INDIAB Study [ICMR-INDIAB-19]. Adv Ther. 2025; 42(7): 3265 – 84. doi: 10.1007/s12325-025-03200-z.
2. Chandrasekaran B, Arumugam A, Pesola AJ, Kundapur PP, Rao CR. Development, implementation and evaluation of a smartphone application aimed to reduce sedentary time and increase physical activity among Indian sedentary office workers - findings from SMART-STEP trial. BMC Public Health. 2025; 25(1): 1806. doi: 10.1186/s12889-025-23049-9.
3. Naik NG, Chandrasekaran B, Patil RN, Kamath SU. Relation of skinfold thickness with the serum lipids, glucose and blood pressure among Indian sedentary office workers. J Health Popul Nutr. 2024; 43(1): 212. doi: 10.1186/s41043-024-00706-0.
4. Anjana RM, Unnikrishnan R, Deepa M, Pradeepa R, et al. Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). Lancet Diabetes Endocrinol. 2023; 11(7): 474 – 89. doi: 10.1016/S2213-8587(23)00119-5.
5. Dhali B, Chatterjee S, Sundar Das S, Cruz MD. Effect of Yoga and Walking on Glycemic Control for the Management of Type 2 Diabetes: A Systematic Review and Meta-analysis. J ASEAN Fed Endocr Soc. 2023; 38(2): 113 – 22. doi: 10.15605/jafes.038.02.20.
6. Saboo N, Kacker S. A Study on Yoga-Based Lifestyle Intervention versus Dietary Intervention Alone on Cardiometabolic Risk Factors among People with Prediabetes. Ann Afr Med. 2024; 23(2): 202 – 12. doi: 10.4103/aam.aam_56_23.
7. Madhu SV, Rao PV, Chandalia HB, Jothydev K, Gupta A; for Research Society for the Study of Diabetes in India. Yoga and prevention of type 2 diabetes - The Indian Prevention of Diabetes Study (IPDS). Diabetes Metab Syndr. 2024; 18(7): 103088. doi: 10.1016/j.dsx.2024.103088.
8. Srivastava K, Rathod H, Borgaonkar C, Rathi M, R A, Sujanyal S. Effectiveness of Multifaceted Lifestyle Interventions in Prediabetic Adults: A Field Study in an Urban Slum Population of Pune, India. Cureus. 2024; 16(9): e68635. doi: 10.7759/cureus.68635.
9. Jeemon P, Haregu T, Sivasubramonian S, Thoniparambil Ravindranathanpillai L, et al. Effects of a peer-support lifestyle intervention on diabetes incidence in India (K-DPP): 9-year follow-up of a cluster-randomised, controlled trial. Lancet Glob Health. 2026; 14(6): 103927. doi: 10.1016/S2214-109X(26)00057-4.
10. Patel AK, Banga C, Chandrasekaran B. Effect of an education-based workplace intervention (move in office with education) on sedentary

behaviour and well-being in desk-based workers: a cluster randomized controlled trial. Int J Occup Saf Ergon. 2022; 28(3): 1655 - 63. doi: 10.1080/10803548.2021.1916221.
11. Chandrasekaran B, Rao CR, Pesola AJ, Arumugam A. Effectiveness of technology-assisted and self-directed interventions to sit less and move more among Indian desk-based office workers: A three-arm cluster randomised controlled trial (SMART-STEP trial). Appl Ergon. 2025; 127: 104528. doi: 10.1016/j.apergo.2025.104528.
12. Chandrasekaran B, Arumugam A, Pesola AJ, Rao CR. "Balancing work and movement": barriers and enablers for being physically active at Indian workplaces - findings from SMART STEP trial. Int J Behav Nutr Phys Act. 2024; 21(1): 110. doi: 10.1186/s12966-024-01661-z.
13. Shaikh A, Mohapatra S, Chandrasekaran B. "Occupational sitting kills; but who cares?": Quantitative analysis of barriers and facilitators of sedentary behavior in Indian white-collar workers. Arch Environ Occup Health. 2022; 77(2): 96 – 108. doi: 10.1080/19338244.2020.1853018.
14. Bora N, K V, Verma A, Bharti AK, Sinha MK. Physical activity and sedentary behavior perceptions in overweight and obese adults: A systematic review of qualitative study. F1000Res. 2024; 13: 787. doi: 10.12688/f1000research.152905.1.
15. Chandrasekaran B, Rao CR, Thirunavukkarasu E, et al. Effectiveness of mHealth Interventions on Physical Activity and Sedentary Behavior Among Office Workers: A Systematic Review and Meta-analysis. J Occup Rehabil. 2026 Mar 31. doi: 10.1007/s10926-026-10373-z.

Table 1: Baseline demographic and clinical characteristics of study participants

Parameter	Value
Age, years, mean ± SD	39.8 ± 9.6
Male	40 (60.6%)
Female	26 (39.4%)
Sedentary work duration, hours/day	8.3 ± 1.4
Body mass index, kg/m²	27.1 ± 3.4
Waist circumference, cm	91.6 ± 10.2
Overweight/obese participants	43 (65.2%)
Current smokers	9 (13.6%)
Alcohol consumption	12 (18.2%)
Regular exercise before enrolment	14 (21.2%)
Baseline daily step count	4970 ± 1650

Table 2: Changes in glycemic and cardiovascular parameters following regular walking breaks

Parameter	Mean ± SD		Mean change (95% CI)	p-value*
	Baseline	Follow-up		
Fasting blood glucose, mg/dL	101.8 ± 14.6	96.2 ± 12.8	−5.6 (−8.3 to −2.9)	<0.001
Postprandial blood glucose, mg/dL	139.7 ± 22.5	127.0 ± 19.8	−12.7 (−17.3 to −8.1)	<0.001
Systolic BP, mmHg	128.6 ± 12.1	123.8 ± 10.9	−4.8 (−6.9 to −2.7)	<0.001
Diastolic BP, mmHg	82.4 ± 8.1	79.3 ± 7.4	−3.1 (−4.8 to −1.4)	<0.001
Resting heart rate, beats/min	78.5 ± 8.6	75.6 ± 7.8	−2.9 (−4.5 to −1.3)	<0.001
BMI, kg/m²	27.1 ± 3.4	26.5 ± 3.3	−0.6 (−0.8 to −0.4)	<0.001
Waist circumference, cm	91.6 ± 10.2	89.2 ± 9.8	−2.4 (−3.2 to −1.6)	<0.001
*Paired t-test.				

Table 3: Changes in activity, fatigue and feasibility-related outcomes

Outcome	Baseline	Follow-up	p-value
Daily step count, mean ± SD	4970 ± 1650	7780 ± 1910	<0.001
Perceived fatigue score, mean ± SD	5.8 ± 1.7	3.8 ± 1.5	<0.001
Participants with musculoskeletal discomfort	41 (62.1%)	24 (36.4%)	<0.001
Mean adherence to 50:10 schedule	–	83.6 ± 10.4%	–
Adherence ≥80%	–	46 (69.7%)	–
Mild transient walking-related discomfort	–	5 (7.6%)	–
Serious walking-related adverse events	–	0	–

Table 4: Correlation between adherence to the walking-break schedule and improvement in major outcomes

Outcome improvement	Pearson correlation coefficient (r)	p-value
Reduction in postprandial glucose	0.42	<0.001
Reduction in systolic blood pressure	0.36	0.003
Reduction in perceived fatigue score	0.48	<0.001
Increase in daily step count	0.31	0.011